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ABSTRACT

Intended to address the problems associated with functionally illiterate students, this manual provides vocational educators with strategies for incorporating reading skills into specific content area instruction. The exercises stress the skills necessary to assess vocational classroom reading materials, develop content specific vocabulary, and comprehend dense technical material. In each of these areas, the manual introduces a particular developmental reading technique, provides sample exercises from vocational textbooks, and then allows the instructor to develop a lesson from his/her own textbook using the technique. Instructor worksheets are provided. Materials in the section on readability and testing cover such topics as readability analysis, the Fry Graph, the Flesch Readability Formula, application of readability data, the Bormuth Cloze Readability Technique, standardized reading tests, and evaluation of student comprehension. The section on vocabulary development considers directed vocabulary lessons, multiple meanings, structure, and context clues. Topics in the section on comprehension and study skills include guided reading assignments, previewing textbooks, setting goals and objectives, the anticipation guide, SQ3R (Survey, question, read, recite, review), the theory of time-spaced learning, and mapping. An appendix contains materials on syllabication, the Barrett taxonomy, and suffixes and roots. (YLB)

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Reading Across the Vocational Education Curriculum

A Practical Manual for Instructors

This material was produced by Janice Beal from Saddleback Community College, South Campus under a contract with the California State Department of Education, utilizing PL 94-482 funds for Vocational Education National Priority Programs for the Disadvantaged.

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Preface

The primary goal of this manual is to provide vocational educators with strategies for incorporating reading skills into specific content area instruction. Included in these goals are techniques designed to do the following:

- To enrich the vocational instructors' knowledge, attitudes, and skills in reading and reading-related activities.
- To teach the instructors to coordinate content-specific materials with reading instruction.
- To demonstrate techniques for bridging the gap between vocational students' reading abilities and the level required to read printed instructional materials.
- To demonstrate techniques for assisting the limited English speaker with reading assignments.

The manual and course which accompanies it provide little reading theory, but a great deal of practice which can be used easily and successfully in the classroom.

The manual focuses on three wide areas: Readability and Testing, Vocabulary, and Comprehension and Study Skills. There are hundreds of "how to teach reading" and "how to improve reading" workbooks on the market. However, their focus is on reading literature and social sciences. The exercises in this manual stress the unique skills necessary to assess vocational classroom reading materials, develop content specific vocabulary, and comprehend dense technical materials.

Neither the course nor the manual provides methods for teaching beginning reading. The problems associated with the functionally illiterate student in the vocational classroom are critical and it would be simplistic to attempt to

address the needs in a one unit course. Rather, the manual is designed to provide developmental reading techniques.

In each of the three areas the manual introduces a particular developmental technique, provides sample exercises from vocational textbooks, and then allows the instructor to develop a lesson using the technique from his/her own textbooks. In the final step, the instructor takes the strategy back to the classroom to try out on his/her students.

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What Is Reading?

Directions: Silently read the paragraph below and answer the questions with complete sentences.

THE MARLUP

The marlup was poving his kump. Parmily a narg horped some whev in his kump. "Why did vump horp whev in my frinkle kump?" the marlup jufd the narg. "E'nm muvvily trungy," the narg grupped. "Er heshed vump norpled whev in your kump. Do vump pove your kump frinkle?"

1. What was the marlup poving?

_____

_____

2. What did the narg horp in the marlup's kump?

_____

_____

3. What did the marlup juf the narg?

_____

_____

4. Was the narg trungy?

_____

_____

5. Who are the characters in the story?

_____

_____

READABILITY & TESTING

Readability and Testing

This component of the course deals with the readability level of printed materials and testing for purposes of discovering reading ability and evaluating course progress. Readability is based on the premise that comprehension of print material does not depend solely on the skills of the reader. The way words are presented can make reading easy or hard.

Since 1923, many methods have evolved for determining the reading ease of materials. Most of these methods use numerical standards called "Indexes" and can be related to educational grade level equivalents.

It is important to keep in mind that the readability formulas only predict the probable grade level. Data collected will be only an estimate of the grade level. Many factors influence the ease by which the printed word can be read. Some of these factors will be discussed in the course.

Two aspects of testing will be presented. The first is a brief look at the standardized reading tests which evaluate a student's reading ability in relation to other students of the same age and grade. Standardized tests help instructors determine which students may need extra assistance and select materials appropriate for the class.

The second aspect of testing provides ideas for developing evaluation tests which measure the students' comprehension of course content.

Purposes for Analyzing the Readability of Print Materials

Purposes for Analyzing

1. Allows instructors to make more appropriate choices of textbook selection and adoption.

2. Allows instructors to examine print materials currently being used, to note those sections which may be easier or more difficult to read.

3. Allows instructors to plan better reading assignments.

4. Allows instructors to modify teaching procedures relevant to the use of the textbook or other print materials.

5. Allows instructors to better integrate textbooks and other print materials within the total course curriculum.

Sampling Procedures for Readability Analysis

Random Sample:

Randomly select one sample of at least 100 words from each chapter of your text, if your chapters are approximately equal in length (number of pages).

Stratified Sample:

If your textbook chapters are not of equal length (the distribution of pages is greatly uneven) divide the number of pages in the text by the number of chapters, which will give you n. Do a readability analysis of at least 100 words on every nth page. This will give you a stratified sample. If the nth page contains no narrative material select a sample on the page which follows.

EXAMPLE:

1. 340 pages in the text.
2. 12 chapters in the text.
3. Divide 12 (chapters) into 340 (pages) which gives n (28 rounded off).
4. Select your first sample on any random page which falls between 1 and 28. After readability analysis on your first sample count every 28th page for succeeding samples until you come to the end of the text.

Fry Graph

Developed by Edward Fry in 1963, the Fry Graph is used to predict the reading level of materials from the first grade through the college level. The FRY method uses a count of syllables and sentence length as the two predictors.

Directions for Working Readability Graph:

1. Select sample passages following the procedure outlined on page 6. Count out exactly 100 words starting with the beginning of a sentence. As numerals such as 10, 376, etc. do not contain syllables, they should not be counted. The same is true of symbols (x, ±), initials (E.P.), or abbreviations (adj.). Do count proper nouns. Count contractions and hyphenated words as one word.

2. Count the number of sentences in the 100 words (estimating length of the fraction of the last sentence to the nearest 1/10th). Example: last sentence has 20 words, 100th word of sample is the second word in the sentence. The estimated length of that fraction would be 0.1.

3. Count the total number of syllables in the 100 word passage

(refer to "principles of syllabication" *).

Example:

Matching student reading ability with textbook readability helps insure reading success. (25 syllables)

4. Now that you have your two predictors (number of sentences and number of syllables) you are ready to plot the graph.

Enter graph with average sentence length (locate number of sentences per 100 words along left side of graph) and average number of syllables per 100 words (located along the top of the graph). Place dot where these two lines intersect. Area where dot is plotted will give you the approximate grade level.

* See Appendix

Instructor Worksheet

Fry Graph

Use the following paragraph to compute a sample readability analysis. Compare your results with the data on the bottom of the page to determine if you are using the Fry readability graph correctly.

Fry Test on Auto Mechanics

For effective valve seating and sealing, the valve face must be concentric with the valve stem. Also, the valve guide must be concentric with the valve face. In addition, the valve-face angle must match the valve-seat angle (or have an interference angle). Thus, as a first step in valve-seat service, the valve guides must be cleaned and serviced.

Valve seats are two types. The integral type is actually the cylinder block or head. The insert type is a ring of special metal set into the block or head. Replacing seat inserts and grinding seats are described below.

A valve-seat/insert may be badly worn.

100th word: valve-seat/insert
Sentences: 8.3 (2nd word out of 7 = approximately .3)
Syllables: 140
Readability level: 6th grade

Instructor Worksheet

<u>You and Your Food</u> by Ruth Bennett White (Third Edition)

Chapter 3

Milk: The Best Food for Calcium

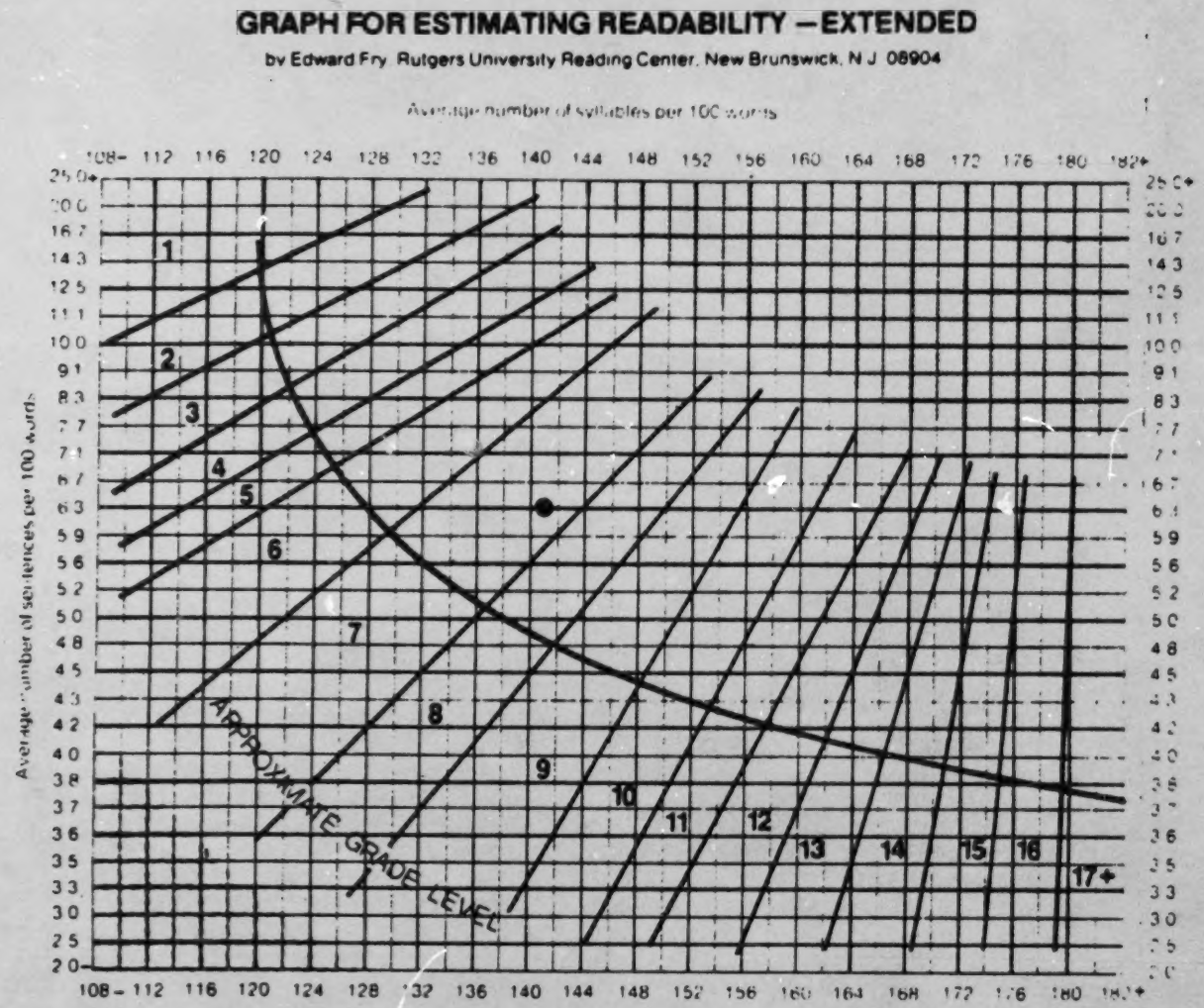
Milk Helps Build Good Posture and Good Teeth

You need many different nutrients to build good teeth and good bones for posture. Calcium, a mineral, is one of these. Calcium is the most abundant mineral in the body, and most of it is found in the bones.

In a way, the construction of the body is like that of a skyscraper. The skyscraper has to be supported by an inner structure of steel. The muscles and skin of your body are supported by an inner structure of bone. The bones make up a large part of the total weight and bulk of the body, and 99 percent of the

100th word: of
Sentences: 6.6 (20 words out of 32 = approximately .6)
Syllables: 135
Readability level: 7th grade

Fry Graph


GRAPH FOR ESTIMATING READABILITY — EXTENDED
by Edward Fry Rutgers University Reading Center, New Brunswick, N J 08904
Average number of syllables per 100 words
108– 112 116 120 124 128 132 136 140 144 148 152 156 160 164 168 172 176 180 182+
Average number of sentences per 100 words
APPROXIMATE GRADE LEVEL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17+

Sample

Fry Graph

Select a sample passage from your own textbook. Apply the Fry Graph

Enter the data below:

Title of text:_____

Author of text:_____

Sample page number:_____

100th word:_____

Sentences:_____

Syllables:_____

Readability level:_____

Flesch Readability Formula

Developed by R. E. Flesch in 1948, this formula was designed for secondary and post-secondary reading materials. The Flesch Formula uses the same predictors as the Fry Graph (sentence length and count of syllables); however, instead of the graph, mathematical computations are used to find the Reading Ease Score.

Directions to Find Flesch Reading Ease Score:

1. Select sample passages using the procedure described on page 6.
   Count out exactly 100 words beginning with a beginning of a sentence. Count as a word all letters, numbers, or symbols that are surrounded by white space. Count contractions and hyphenated words as one word.

2. Count the number of sentences in the 100 words.
   The 100 word mark will usually fall in the middle of a sentence. Count this last sentence if the 100 word mark falls after more than half of the words in the sentence, otherwise disregard the last sentence. For example: This was not/the case. The 100 word mark is after more than half the words in the sentence so you would count it. In this formula you are to count as a sentence each unit of thought that ends with a period, question mark, exclamation point, semicolon, or colon. In dialogue, count the words "he said," etc., as part of the sentence to which they are attached.

3. Figure the average sentence length.

The number of words in sample, divided by the number of sentences.

Example: 100 words, 5 sentences = 100 ÷ 5 = 20. 20 is your average sentence length.

4. Count the total number of syllables in the 100 word passage.

Refer to "Principles of Syllabication" *.

Example: Matching student reading ability with textbook readability helps insure reading success. (25 syllables).

As you have counted numbers and symbols as words, you must also arrive at a "syllable" count for those "words". To do this, count each number as one word and count each digit within the number as a syllable: e.g., 1979 = 1 word, 4 syllables; 23 = 1 word, 2 syllables.

You now have the input necessary to apply the Flesch Formula and find the Reading Ease Score:

A. Multiply the average sentence length (step 3) by 1.015.

B. Multiply the number of syllables (step 4) by .845.

C. Add the results of (A) and (B).

D. Subtract (C) from 206.835.

\-_____

= _____ Reading Ease Score

* See Appendix

Example:

Average sentence length = 20

Step A: 20 x 1.015 = 20.300

Number of Syllables = 160

Step B: 160 x 0.845 = 135.200

Step C:
```
  20.300
+135.200
 155.500
```

Step D:
```
 206.835
-155.500
  51.335
```
READING EASE SCORE

To convert READING EASE SCORE to grade level use the chart below:

Reading Ease Score	Description of Style	Grade Level
90 to 100	Very easy	5th
80 to 90	Easy	6th
70 to 80	Fairly easy	7th
60 to 70	Standard	8th & 9th
50 to 60	Fairly difficult	10th to 12th
30 to 50	Difficult	13th to 15th
0 to 30	Very difficult	College Graduate

Note: numbers 1.015, .845, and 206.835 are constants.

Flesch Readability Formula

Use the following sample paragraph to compute a readability analysis. Compare your results with those listed below to determine if you are using the Flesch Readability Formula correctly.

The Consumer in America by W. Richard Plunkett

Chapter 6

Getting and Using Credit

A business that loans money or sells goods and services to customers and allows them to be paid for later is called a creditor. The person who borrows money or buys on credit is called the debtor. Before creditors will give you a loan or grant you credit priviledges, they want to know as much about you as they can. They want to know that they can trust you to pay your debts.

Many creditors believe that the most important thing about a person who wants credit is his or her past record of paying bills. You must be able

Average sentence length = 20

Step A: 20 x 1.015 = 20.300
Number of syllables = 154

Step B: 154 x .845 = 130.130

Step C:
$$\begin{array}{r} 20.300 \\ 130.130 \\ \hline 150.430 \end{array}$$

Step D:
$$\begin{array}{r} 206.835 \\ 150.430 \\ \hline 56.405 \end{array}$$

Grade level: 10-12th grades

PARTICIPANT SAMPLE

Flesch Readability Formula

Select a sample passage from your own textbook. Apply the Flesch Readability Formula. Enter the data below:

Title of text:_____

Author of text:_____

Sample page number:_____

100th word:_____

Sentences:_____

Average sentence length:_____ x 1.015 = _____

Syllables:_____ x .845 = + _____

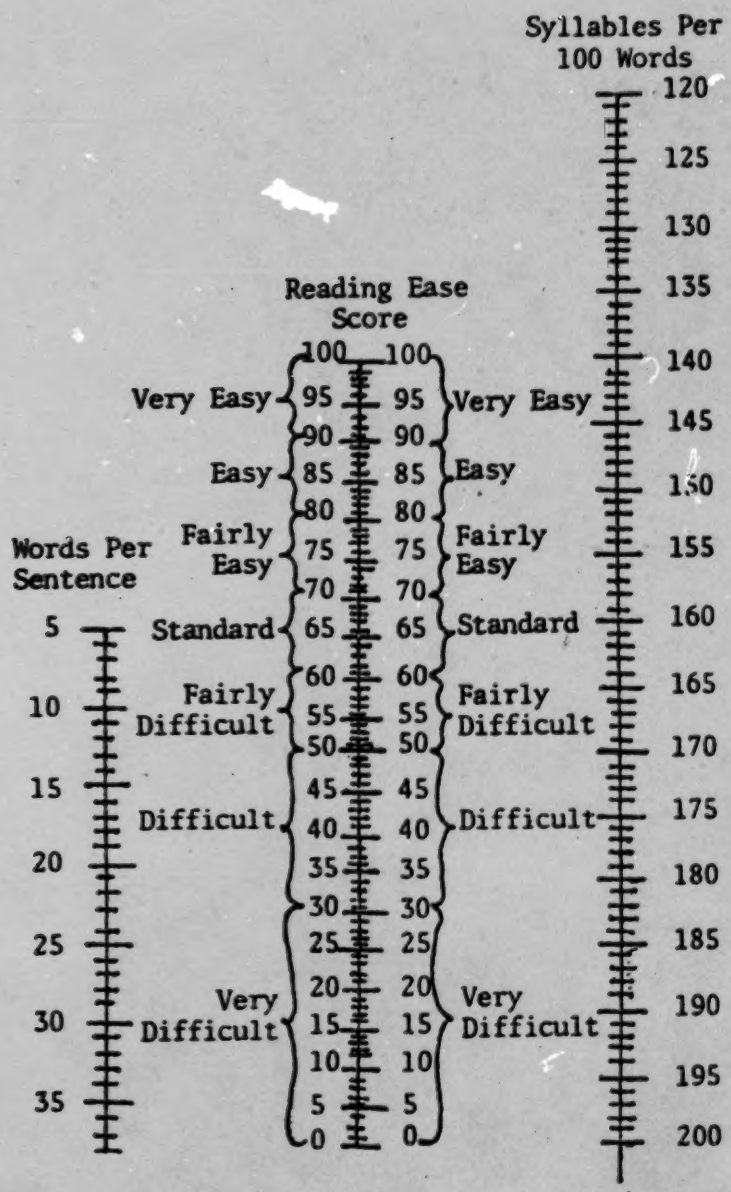
206.835 - _____

= _____

Flesch Reading Ease Score:_____

Flesch Grade Level Equivalent:_____

Flesch Reading Ease Formula



Application of Readability Data

Variation of Results

As you begin to analyze your textbooks, you will discover that the results will vary from passage to passage and from index to index.

The grade level predicted for a book based upon a large number of 100 word samples was found to have a normal distribution. Several passages from a book may differ by several grade levels because of this. Also, many text-books have more then one author which results in different chapters having different readability levels. In order to get an accurate estimate of the reading level of your text, you should analyze a minimum of eight samples and ideally you would take one sample from each chapter.

The average scores on any given book also vary depending on the readability method applied. This difference is caused by the predictors used and the criteria by which the methods were validated. You should use the index that was designed to measure the predictors which are most important to your content area.

What Readability Data Can Indicate

The information you gather from a complete analysis of a textbook should allow you to:

1. Make more appropriate choices in selecting a new textbook.
2. Determine the ranges within the text and spot the areas that could cause difficulty.
3. Analyze the data based on a knowledge of the predictors used to isolate problem areas. For example: a high Dale-Chall

score, but lower Fry and Flesch may indicate that the text contains a large number of unfamiliar words and you may need to pre-teach vocabulary.

What Readability Data Does Not Indicate

It is important to keep in mind that readability formulas only predict the probable grade level. The data presented is only an estimate. Many other factors affect the ease by which the textbook can be read. Therefore, textbooks should not be selected solely upon readability levels.

Bormuth Cloze Readability Technique

USES:

1. Can help the teacher identify which book a student should be placed in if more than one book is available.
2. Can be used to quickly identify students who will be unable to comprehend the text and to assist in locating more appropriate books.
3. Can help in determining appropriateness of a textbook prior to purchase.

ADVANTAGES:

1. Does not require specialized knowledge of reading or testing to be useful to the classroom teacher.
2. Allows assessment of reading ability without knowing student reading level.
3. Shows ability of individual or group to deal with language and style of a particular book because it involves actual understanding rather than just recognition of words.
4. Helps teacher determine entire range of reading ability in a heterogeneous class.

PROCEDURE:

1. Select a passage: The passage should be 250 words in length. Leave the first and last sentence intact and delete every fifth word.
2. Type the passage: Replace each deleted word with blank spaces of equal length (about 15 spaces).
3. Administer the passage: Instruct the students to read the passage through one time before beginning to fill in the answers. Assure the students that spelling errors will not affect their answer. There is generally no time limit. Be prepared for the fact that some students are frustrated by this exercise because it is new to them.
4. Score the passage: Only the exact word counts as a correct answer (e.g., LARGE is not acceptable for BIG). Convert the number correct into a percentage score. (50 blanks; 2 x number right = %).

independent level	58 - 100%
instructional level	44 - 57%
frustrational level	0 - 43%

CAUTION: The above percentages are based on research using passages in which every fifth word is deleted; you may use another sequence, such as every third, sixth, or tenth word, but these percentages would not apply.

Evaluation of the Basic Cloze Test

1. With 58% correct responses or above, the student is reading at the independent reading level. A student who can read at this level will be able to use a text effectively and help other students.

2. Between 44% and 57% correct responses, the student is reading at the instructional reading level. A student at this level can read satisfactorily provided he/she receives instructional guidance, vocabulary development, and purpose setting from the teacher.

3. With less than 44% correct responses, the student is reading at the frustration level and will meet with little success either reading or comprehending the text. Alternative materials of supplementary procedures should be used to provide the information the student needs. This level should be avoided. When students are "reading" at the frustration level, they:
   - dislike reading.
   - show anxiety in reading situations.
   - read orally with poor rhythm and timing.
   - point to words as they read them.
   - make poor contributions to classroom discussions.
   - have poor work habits.

The Consumer in America by W. Richard Plunkett

Chapter 1

Consumer Needs and Wants

All of us share some of the same needs. Some needs, such as _____ need to be liked _____ the need to be _____ for what we can _____, cannot be met by _____ things. But other needs _____ us to want goods _____ services. We believe that _____ we get what we _____, we will be happier.

_____ needs are not always _____ same as our wants. _____ example, you may need _____ car. You need to _____ from home to school. _____ What kind of car _____ you want? Do you _____ a station wagon or _____ sports car? The things _____ like and think are _____ important will influence your _____. You must decide whether _____ want fuel economy or _____; a lower price or _____ extras, such as a _____ or a high-powered _____. As a consumer, you _____ weigh your needs and _____, balancing one against another.

_____ can better understand why _____ choose the things you _____ if you understand what _____ your choices. Sometimes your _____ decisions are influenced by _____ your friends like. If _____ friends like a certain _____ of shoe, you may _____ to buy that kind _____.

Your choice about what _____ buy may also be _____ by business. Through advertising, _____ try to talk consumers _____ buying their products or _____. You will read more _____ advertising in chapter 7.

_____, your buying choices will _____ based on what you _____. Everyone needs food, clothing, _____ a place to live. _____ you need to ride _____ bus to school, you must pay the fare.

Many consumer buying choices are based on need; many others on want.

Answer Key

Chapter 1

1. the
2. and
3. known
4. do
5. buying
6. cause
7. and
8. when
9. want
10. our
11. the
12. For
13. a
14. get
15. But
16. do
17. want
18. a
19. you
20. most
21. decision
22. you
23. size
24. fancy
25. radio
26. engine
27. must
28. wants
29. You
30. you
31. do
32. influences
33. buying
34. what
35. your
36. kind
37. choose
38. too
39. to
40. influenced
41. business
42. into
43. services
44. about
45. Often
46. be
47. need
48. and
49. If
50. a

Third Edition You and Your Food by Ruth Bennett White

Chapter 3

Milk: The Best Food for Calcium

Milk Helps Build Good Posture and Good Teeth

You need many different nutrients to build good teeth and good bones for posture. Calcium, a mineral, is _____ of these. Calcium is _____ most abundant mineral in _____ body, and most of _____ is found in the _____.

In a way, the _____ of the body is _____ that of a skyscraper. _____ skyscraper has to be _____ by an inner structure _____ steel. The muscles and _____ of your body are _____ by an inner structure _____ bone. The bones make _____ a large part of _____ total weight and bulk _____ the body, and 99 percent _____ the calcium found in _____ whole body is in _____ bones and teeth.

Perhaps _____ may think of the _____ and teeth not as _____, but as something more _____ stone or steel. In _____ the bones and teeth _____ living structures and are _____ undergoing change. This means _____ the demands for calcium _____ of two kinds. The _____ we eat must supply _____ both for growth of _____ and teeth, and for _____

maintenance of life processes. _____ growing girl or boy _____ needs more calcium than _____ adult. To meet this _____ , nutritionists recommend that a _____ in her teens include _____ her daily diet 1.3 grams _____ calcium (a gram is _____ twenty-eight of an ounce). _____ teen-boy needs 1.4 grams daily. _____ the other hand, adults _____ .8 gram daily.

Milk is _____ best food for calcium.

_____ is very low in _____ foods, but one quart _____ milk contains 1.15 grams of _____. It is easy to _____ a quart of milk _____ day and still be able to eat the other foods you need for good health. The comparisons in the table show how difficult it is to get needed calcium from other foods.

Answer Key

Chapter 3

1. one
2. the
3. the
4. it
5. bones
6. construction
7. like
8. The
9. supported
10. of
11. skin
12. supported
13. of
14. up
15. the
16. of
17. of
18. the
19. the
20. you
21. bones
22. living
23. like
24. reality
25. are
26. constantly
27. that
28. are
29. food
30. calcium
31. bones
32. the
33. A
34. naturally
35. an
36. need
37. girl
38. in
39. of
40. one
41. A
42. On
43. need
44. the
45. Calcium
46. most
47. of
48. calcium
49. drink
50. a

Standardized Reading Tests

Description

There are over 2,000 Standardized Reading Tests published in the United States. These instruments have been normed to a specific target population and their reliability and validity have been determined. There are four types of standardized reading tests:

1. Survey Tests - Group tests measuring comprehension, vocabulary, and sometimes rate. Used by the classroom teacher.
2. Analytical Tests - Group tests, most are survey tests with diagnostic subtests. Used by the classroom teacher or the remedial reading teacher. Provides more detailed analysis of a student's reading difficulty.
3. Diagnostic Tests - Individual tests which need practical or special training to administer. Provides detailed analysis of disabilities.
4. Special Tests - Most often group tests covering only one aspect of reading.

The Survey Tests will be the only type discussed in this training session.

Purposes of Administering Standardized Reading Tests

A. For Classroom Teachers

1. To determine the range and the average of class reading ability.
2. To identify those students who read above age-grade placement, at age-grade placement, and below age-grade placement.
3. To identify those students who may need assistance in reading the regular content materials.
4. To aid in selection of appropriate print materials.
5. To help identify those students whose reading is so limited that they will need assistance from a reading resource person.
6. To measure student progress.

B. For School Administrators

1. To measure the effectiveness of instruction.
2. To evaluate new programs.
3. To identify the reading range of the total population of students.

Common Characteristics of Standardized Survey Tests

1. Group tests are easier to administer.
2. Can be administered by the classroom instructor.
3. Are appropriate for a wide range of grade levels.
4. Can measure reading comprehension.
5. Take less than one hour to administer.

Selection of Standardized Tests

Some of the most commonly used standardized survey tests for the secondary and post secondary levels are:

Grades	
7 - 14	Nelson-Denny Reading Test (vocabulary, comprehension, rate) Houghtin-Mifflin
Adults	Adult Basic Learning Examination (ABLE) (vocabulary, comprehension) Harcourt-Brace-Jovanovich, Inc.
9 - 14	Cooperative English Tests (vocabulary, comprehension, rate) Educational Testing Service
7 - 12	Gates-MacGinitie Reading Tests (speed, vocabulary, comprehension) Houghton-Mifflin
6 - 12	California Achievement Tests (vocabulary, study skills, comprehension) McGraw-Hill
6 - 12	Comprehensive Test of Basic Skills (vocabulary, study skills, comprehension) McGraw-Hill
7 - 9	Metropolitan Achievement Tests (vocabulary, comprehension) Harcourt-Brace-Jovanovich, Inc.

You should obtain a copy of one or more of these tests and the accompanying "Administrators Manual" and review them. A good way to become familiar with the sample you select is to actually "take it" yourself.

Reporting the Results of a Standardized Test

Because raw scores by themselves provide very little insight into how a student has performed on a test, various transformations of this score are made in an attempt to provide more adequate information. These transformations allow the instructor to obtain, from the raw score, some type of derived score. Two of the most commonly used derived scores are grade equivalents and percentile ranks.

Grade Equivalent Scores

Grade equivalent scores are frequently used to indicate the developmental level at which a student is functioning. For example, a GE score of 9.2 means the student has performed on the test at a level equivalent to the way the average student in the second month of ninth grade has performed on the test. It is important to keep in mind that Grade Equivalent Scores do not represent standards. They are simply an indication of how close to the average a student is performing. Since half the group will always be above average and half below average it is impossible for all students to have a GE Score equal to their chronological grade placement. It is important to note that a GE score on a test actually determines the student's level of Frustration. At this level he/she comprehends the concepts and ideas presented with less than 75% accuracy. The student experiences anxieties and often points to words as he/she reads. The student's Instructional level is one year below Frustration. At this level a student can read satisfactorily with instructional guidance. A course textbook should match the Instructional level of a class. Another year below represents the student's Independent level. At this level, a

student can set his/her own goals and manage the vocabulary and concepts alone. Ideally, supplementary reading materials for a course should be written at the Independent level of most of the students.

Percentile Ranks

In the case of Grade Equivalent Scores, an attempt is made to give meaning to an individual's raw-score by comparing it to the average value for different grade groups. In this manner we are identifying the group in which he/she would be an average member.

Very often rather than taking this approach we find it makes more sense to compare him/her to his/her own group--all the people in the U.S. at the grade level. Percentile norms are one set of scores that are used to make this type of comparison.

Percentile norms are usually expressed by saying that a person falls at the p-th percentile of that he has a percentile rank of p. In this case p represents the percent of the group which scored lower than he/she did. Thus, a 9th grade student who falls at the 60th percentile on a science test has surpassed 60% of the 9th grade population.

Percentile norms are applicable in virtually every situation. They can be determined whenever an appropriate normative group can be obtained. They are, perhaps, one of the easiest scores to understand and are widely used.

Evaluating Students

Almost every course syllabus includes a place for quizzes and examinations. A test should be designed to demonstrate what the student learned and if he/she is able to use what was learned. Unfortunately, however, many tests are designed according to the "Marlup philosophy" - they test only the student's ability to regurgitate.

In order to prepare a comprehensive examination it is important to have an awareness of the varied skills involved in reading and to pinpoint those areas which are important for mastery in your particular occupation. In a 1981 survey conducted at Saddleback College, occupational instructors indicated that the following skills were necessary for classroom success:

1. Finding the Main Idea.
2. Recalling Details.
3. Organization and Sequence (particularly following Written Directions)
4. Application.

* Barrets Taxonomy presents a thorough explanation of the skills which are generally considered "comprehension". Missing from this model, however, is an area critical to the teaching of occupational education-application.

When developing an examination it is important to include questions which evaluate all of the skills required for mastery in the subject area. Open book examinations may require Recognition level questions. Closed book tests should include Recall, Reorganization, Making Inferences, Evaluation and Application.

* See Appendix

Sample Comprehension Questions

1. Recognition

   A. Find the sentence in Chapter 6 which defines the term "brazing"?

   B. What is the Diazo process? (p. 178)

2. Recall

   A. Name the four basic methods of fabricating metal parts.

   B. Iron ore, limestone, and _____ are the three components of steel.

3. Reorganization

   A. When inking a tracing, what definite order of working does an experienced draftsman follow?

   B. Rate the following in terms of their efficiency

      _____ an electric motor

      _____ an alternating current

      _____ a steam engine

      _____ a car engine

4. Making Inferences

   A. What happens when you invert a bottle of ketchup? How does this demonstrate viscosity?

   B. Why would cold rolled steel be preferred over the use of hot rolled steel?

5. Evaluation

A. If you were a draftsman would you use blueprints? Why or why not?

B. Do you feel that recycling metals is important? Explain your answer.

6. Application

A. Convert 5 s of conductance to ohms of resistance.

B. Raise the hood on a diesel-equipped car. Make sketches showing the location of the various components.

Developing a Comprehensive Examination

Using your own textbook write two sample questions from each category.

1. Recognition:

   A. _____

   _____

   B. _____

   _____

2. Recall:

   A. _____

   _____

   B. _____

   _____

3. Reorganization:

   A. _____

   _____

   B. _____

   _____

4. Making Inferences:

   A. _____

   _____

   B. _____

   _____

5. Evaluation:

A. _____

_____

B. _____

_____

6. Application:

A. _____

_____

B. _____

_____

VOCABULARY DEVELOPMENT

The task of the occupational instructor, first and foremost, is the teaching of the subject. However, the teaching of vocabulary can greatly aid in this task.

Three factors make the teaching of vocabulary valuable for the occupational instructor and his/her student.

1. Reading test scores show that the more vocabulary taught, the better the comprehension scores.

2. When students master more content specific vocabulary, they also master more content area concepts.

3. When vocabulary instruction is applied in a consistent manner, it provides reinforcement and repitition which results in the mastery of content concepts as well as reading skills.

The teaching of vocabulary development will enable you to make reading easier for the less able student and at the same time improve the mastery of your content area concepts.

Directed Vocabulary Lessons

Learning new vocabulary is a critical element of any vocational area. This course will present two techniques for introducing new terminology to students. These are using Structure and Content Clues. Since it's impossible to present all of the unfamiliar terms which your students will encounter, these techniques give students the tools for developing vocabulary on their own.

"Look it up in the dictionary," is not always the best advice to give to a student. If a textbook is written at the student's level of frustration there may be ten or more unfamiliar terms on each page! Interrupting reading to look up all of them in the dictionary is guaranteed to destroy comprehension. Also it was noted previously that many words have multiple meanings. The student may not know which definition applies to the text. Students should be encouraged to use the dictionary only if other methods fail.

It is helpful for instructors to pronounce important new words for the class. Students, particularly poor readers, often cannot distinguish between "word calling" and understanding word meanings. They may spend hours of precious study time during a semester attempting to pronounce words which are phonetically irregular.

Awareness of the Need

There are two types of vocabulary that are most likely to plague the student reading a textbook in an unfamiliar subject: (1) technical terminology, and (2) high level general words that are often used in the text. Below are two samples.

	Technical Terminology	General
ELECTRONICS	1. hysteresis	1. amplify
	2. diode	2. circuit
	3. ampere	3. cycle
	4. hertz	4. energy
	5. sync	5. conduct
FASHION DESIGN	1. textile	1. abrasion
	2. armseye	2. generic
	3. interfacing	3. volatile
	4. soutache	4. hue
	5. bodice	5. reinforce

On the paper provided by the instructor make two lists similar to the samples using words from your subject area. Label the lists.

Multiple Meanings

Students are often frustrated by words which they "think they know." Technical vocabulary often includes words with multiple meanings. The word may be commonly used in everyday conversation, but have an entirely different meaning in an occupational context. This is troublesome to all students and creates even greater problems for the limited English speaker. Consider the word "dart." The student may be familiar with the meaning "to move with sudden speed," or he/she may recognize the dart thrown at the dartboard. However, used in clothing services a dart is "a stitched fold in a garment used to give shape to fit the body curves." It is important to alert students to any technical terms which have different common meanings. The technical meaning has nothing to do with the commonly used meaning. Write as many meanings as you can for each word listed below:

1. work

   A. common use_____

   B. scientific definition_____

2. bias

   A. common use_____

   B. clothing services_____

   C. electronics_____

3. conductor

   A. music_____

   B. transportation_____

   C. electronics_____

4. basting

   A. food services_____

   B. clothing services_____

5. pitch

   A. sports_____

   B. construction_____

   C. music_____

   D. advertising_____

Instructor Worksheet

Using your own textbook or supplementary reading, find and list technical terms which may have alternate meanings.

	Word	Common or Alternate Meaning	Definition in Your Content Area
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Structure

The English language borrows heavily from Latin and Greek. As a result many words in the language share common word parts called Affixes and Roots. A root is the main meaning - carrying part of a word, and an affix attaches to it. The affix which comes before the root is called a prefix; the affix which comes after the root is called a suffix. One word part is often the key to twenty or more new words.

Prefixes and roots are generally consistent in meaning and are invaluable tools for understanding new words. Suffixes identify parts of speech and help students to use new words. Included in the manual are lists of frequently used word elements. The exercises following are designed to demonstrate the use of structure in building vocabulary and allow you to discover the roots and affixes which frequently occur in the particular occupational areas.

Using Roots and Affixes

Using the lists provided guess at the literal definition of the words listed below by dividing the words into affixes and roots. *

1. facsimili - fac-make simili-like
   literal definition-a likeness; a copy

2. synchronize - syn-same chrono-time ize-verb
   literal difinition-to set at the same time

3. hydrophilic - _____

4. panchromatic - _____

5. bisect - _____

6. subscript - _____

7. promotion - _____

* See Appendix

8. pentode - _____

_____

9. renovate - _____

_____

10. manually - _____

_____

Instructor Work Sheet

Using your own textbooks and supplementary materials, identify word elements which occur frequently. List the root or affix and one sample word in which it is used.

	Word Element	Meaning	Sample
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Using Context Clues to Develop Vocabulary

The best definition of a word is not necessarily the first one listed in the dictionary. Rather it is the meaning which was intended by the author in a particular context. Context clues are hints that readers can use to understand the meaning of unfamiliar terms. Learning to use context clues is a valuable vocabulary building tool. It allows the reader to experience a word in use and therefore easily incorporate the word into a speaking or reading vocabulary. Using context clues insures that the reader understands the meaning of the word in the way the author intended. Finally, context clues allow the reader to understand a sentence or paragraph without interrupting the reading process to use a dictionary. The ability to use context clues is an important aspect of reading for all students, but it is especially critical for the limited English speaker who might otherwise spend hours using the dictionary to understand one page of text!

Four kinds of context clues are used most often:

a. Direct definition

b. Synonym

c. Antonym

d. Examples which encourage the reader to draw from his/her background of information

A direct definition is the one most often found in a technical textbook. It may be set off by commas or signaled by words such as "is," "refers to" or "means." Notice the examples:

1. A vacuum is the absence of air or any other matter.

2. Gluttony, an excess in eating or drinking, is harmful to your health.

Synonym context clues use familiar words or phrases to assist in the meaning of unfamiliar words.

1. Wear rubber gloves when the hands must come into contact with irritants which might cause dermititis. If any skin blisters or other skin conditions develop, see a physician.

In the second sentence, the use of the terms "skin blisters" and "skin conditions" tell the reader that dermatitis is a skin disease.

Antonym clues use a familiar word or phrase which means the opposite of the new term.

1. Cutting tools must always be sharp. A blunt tool will damage the wood.

Synonym and antonym context clues are often signaled by the following words:

but	despite
yet	in spite of
nevertheless	while
however	although
even though	

The last type of context clue, example, uses description to tell the meaning of an unknown word.

1. Water stored behind a dam has potential energy which will be released when the water thunders over the spillway.

Instructor Worksheet

Find the meaning of the underlined words and the kind of context clues used in the sentences below:

1. Moisture will not <u>adhere</u> to the inked image area. You can actually see the moisture run off and pull away from the greasy inked image.

   Definition: _____

   Kind of context clue: _____

2. To start fission in an element such as Uranium 235, scientists <u>bombard</u> it with atomic bullets that have been passed through a moderator to slow them down.

   Definition: _____

   Kind of context clue: _____

3. <u>Viscosity</u> is a term that refers to the tendency of liquid to resist flowing.

   Definition: _____

   Kind of context clue: _____

4. He <u>immersed</u> the negatives in a bath of sodium thiosulphate to remove the unexposed silver salts.

   Definition: _____

   Kind of context clue: _____

5. Additional information on these and other problems and their causes and <u>remedies</u> are listed on the following pages.

   Definition: _____

   Kind of context clue: _____

6. If the buyer does not pay on time or does not pay the full amount owed by the due date, the seller may reposses, or take back, the goods.

   Definition: _____

   Kind of context clue: _____

7. The entire eastern half of the United States enjoys water surplus, while most of the country to the west of the Mississippi is water-deficient and arid.

   Definition: _____

   Kind of context clue: _____

8. There seems to be a sequential process in rocks, whereby igneous rocks become sediments, sediments become sedimentary rocks, then metamorphic rocks and eventually igneous rocks again.

   Definition: _____

   Kind of context clues: _____

9. Asbestos workers are concerned about the carcinogenic materials in the product.

   Definition: _____

   Kind of context clues: _____

10. Nitrogen, perhaps the most important nutrient, promotes healthy green foliage and stimulates growth.

    Definition: _____

    Kind of context clues: _____

11. The salary I receive is quite small and does not permit me the necessities of life. I am anxious to obtain employment in your institution where there is a greater chance of remuneration for employees.

    Definition: _____

    Kind of context clue: _____

12. I brought along a portfolio of my work. I think the contents may interest you.

    Definition: _____

    Kind of context clue: _____

13. In a doe, the period of lactation following birth is six months. In some European countries a family with two does is assured a year long milk supply if one doe has her kid in the Spring and the other in the Fall.

    Definition: _____

    Kind of context clue: _____

COMPREHENSION AND STUDY SKILLS

Suggestions for Guided Reading Assignments

We have determined that most occupational textbooks are difficult; the readability level exceeds the instructional level of most of the students. However, there are simple techniques which an instructor can implement to close the gap between the book and the reader.

Eighty percent of comprehension is based on the reader's prior knowledge. Therefore, the instructor can be an invaluable help to students in developing a content specific background. Another important fact is that the ability to concentrate is positively correlated to goal achievement. Again, the instructor can contribute to this process. Below is a list of activities which an instructor can use to aid the student in the reading process. These activities will be discussed in this section of the manual.

The instructor can:

1. Set goals and objectives prior to each reading assignment.
2. Develop a list of easy to read supplemental materials which students can use to develop a background in a content area.
3. Encourage students to preview their textbooks.
4. Lecture before assigning reading materials.
5. Demonstrate SQ3R and the theory of Time Spaced Learning. Encourage your students to use the technique.
6. Use Anticipation Guides before each reading assignment.
7. Demonstrate the concept of mapping and encourage your students to use Maps as study guides.
8. Select reading materials which contain study aides such as glossaries, chapter objectives, summaries, illustrations, etc.

Previewing Your Textbook

Student's Name_____

Date_____

Title of textbook _____

Write two or three questions that the title and subtitle suggest:

_____

_____

_____

When was the book published? _____ Is this information significant?____

Why? _____

Write down two or three important ideas that the author presents in the preface, forward, or introduction:

_____

_____

_____

Read the Table of Contents and change the chapter headings into questions. Write 5 questions suggested by 5 different chapter headings:

1. _____

2. _____

3. _____

4. _____

5. _____

If there are appendices in the text, list each one and tell how it will be useful. Also, rapidly glance over each one:

_____

_____

_____

Page through the entire book and look for pictures, maps, charts and graphs. Notice their importance to the information in each chapter. Page through several chapters to discover which study aids have been included. Check below those that you find.

1. Chapter objectives _____
2. Chapter outline _____
3. Headings _____
4. Chapter introduction_____
5. Chapter summary _____
6. Chapter glossary _____
7. Questions for study or review_____
8. Italics _____
9. Footnotes _____
10. Supplementary readings _____
11. Chapter problems or projects _____
12. Other study aids _____

Use Index to gain a preliminary estimate of how much you know about the contents of the book. Read down each column to see how many names, places and terms are familiar to you. From the entire Index, select ten items that you know a lot about and then ten that you know absolutely nothing about. If you cannot find ten items that are completely unfamiliar to you, you already have good background knowledge of the subject and this background will make the test easier to read and to use.

KNOWN	UNKNOWN
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____
6. _____	6. _____
7. _____	7. _____
8. _____	8. _____
9. _____	9. _____
10. _____	10. _____

Setting Goals and Objectives

The most common symptom expressed by a poor reader is inability to concentrate. The student complains that he/she reads a page and has no recollection of what it was about. One reason for this lack of concentration and comprehension is an absence of direction. The student has no idea what he is expected to learn as a result of reading and so he/she absorbs nothing.

Textbook authors and instructors can take the first step toward improved comprehension by helping students to develop goals for reading. It has already been stated that 80% of reading comprehension is based on what the student already knows rather than what is on a page of print. Therefore, textbooks should be used as <u>supplements</u> to instruction. Reading assignments should <u>follow</u> lectures, demonstrations, films or discussions. Each reading assignment should then be given with clear directions. "Read Chapter 4" is not adequate. There may be fifty pages and 50,000 words in Chapter 4 and most students are unable to guess what the instructor considers important. Rather, reading assignments should tell the student what he/she is to "define," "discuss," "compare," "memorize," "explain," "identify," etc.

During the past decade, educators have extolled the virtues of lesson plans which include behavioral objectives. One good result of this trend is that some new textbooks begin each chapter with a list of clear goals for the reader. Notice the examples:

After studying this chapter, you should be able to

- Describe the three methods of cleaning up the exhaust gas.

- Identify and point out the components of, and connections for, the exhaust-gas recirculation system, the air-injection or thermactor system, vacuum advance control system, and catalytic converters.
- Explain how each system works.

After studying this chapter, you should be able to

- Explain the purpose of the transmission.
- Explain what gear ratios are and how they are achieved.
- Explain how torque is related to gear ratio.
- Describe the operation of a manual transmission.
- Explain the purpose of overdrive and how it is achieved.

Instructor Worksheet

Using your own textbook or supplementary reading materials, select two chapters and write goals which you may give to your students.

Title of Text: _____

Subject: _____

1. Chapter _____

After reading this chapter, you should be able to

A. _____

_____

B. _____

_____

C. _____

_____

D. _____

_____

2. Chapter _____

After reading this chapter, you should be able to

A. _____

_____

B. _____

_____

C. _____

_____

D. _____

_____

Anticipation Guide

Definition: The anticipation guide consists of a series of instructor-prepared questions which the students answer before reading. Then a careful reading of the assignment takes place. Finally, students and instructor can re-check and discuss the answers on the guide. An anticipation guide is a pre-reading strategy useful to both instructor and student. It allows the student to preview the vocabulary and concepts important to the chapter. Thus, the student can read with a purpose, actively looking for information mentioned in the guide. The guide can also function as an informal diagnostic tool, allowing the instructor to assess the prior knowledge of his/her students and select the areas in which students may need lecture and support activities.

Sample from Auto Mechanics Fundamentals:

Chapter 2: (Auto Mechanics Fundamentals)

Directions: Place a check mark by those statements which you agree with or believe to be true.

1. _____ The engine block serves as a rigid metal foundation for all parts of an engine.
2. _____ The piston has only one function.
3. _____ It is obvious that the piston head is by far the hottest part of the piston.
4. _____ All ring sets utilize expanding rings.
5. _____ The ideal gearing is easy to construct.
6. _____ Each engine cylinder ordinarily has two valves.
7. _____ There are several methods of causing valves to rotate as they work open and closed.

Sample 2

Anticipation Guide for Cabinetmaking and Millwork by John L. Feirer
Charles A. Bennett Co., 1977
Peoria, Illinois

Directions to student: Place a check mark by those statements below that you agree with or think to be true.

1. _____ Bleaching is a process of lightening the color of the wood surface through application of a two part solution to the wood.

2. _____ Bleaching wood is a common practice in the cabinetmaking business today.

3. _____ Dealing with glue removal is the first step in the finishing process.

4. _____ A small dent in wood can be repaired or raised with a hot steam iron.

5. _____ A good way to cover nail or screw holes is with wood pegs or plugs.

6. _____ Final sanding should be done with at least 600 grit sandpaper.

7. _____ Wood dough is a synthetic wood that comes in many colors and can be used to fill nail holes.

Instructor Worksheet

Select a chapter from your text and develop an Anticipation Guide which highlights the significant concepts and terminology

Subject Area _____

Title of Book _____

Title of Chapter _____

Guide

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

STUDYING TEXTBOOKS EFFECTIVELY

A Study Formula that can be used for more efficient study in any textbook assignment.

Pre-Reading warm-up:

SURVEY:

S

1. Locate the exact pages of the assignment.
2. Survey the entire chapter; turn every page.
3. Note the headings of the main sections.
4. Glance at pictures, maps, charts, tables, graphs.
5. Read the summary at the end of the chapter, and any study questions provided.
6. Be aware of any new vocabulary presented.
7. Set up a time schedule for reading the chapter; push yourself, but keep realistic goals.

QUESTION:

Q

1. As you SURVEY, you automatically ask QUESTIONS.
2. What does the title mean?
3. What does a visual aid have to do with the chapter?
4. What does a certain new word mean?
5. Turn chapter headings into questions.

As you read, take a mini break at least every twenty minutes to one-half hour.

READ:

3

1. Read aggressively! Go for the meaning.
2. Try to find the answers to your questions, and formulate new questions as your understanding grows.
3. Look for the ideas behind the author's words; what is he trying to tell you?
4. Read no more than one page or one section at a time before going on to the next step.
5. Be time conscious.

After each mini break.

RECITE:

1. You might orally recite the main ideas to yourself, to see how much of the assignment you recall.
2. You might also make notes now in order to fix details in your mind.
3. Your recitation will reveal the weak parts of the chapter that will require more attention.
4. Using as many senses as possible will strengthen learning--sight, sound, touch.

Wait 24 hours (no more than 48 hours) and then,

REVIEW:

R

1. Skim back through the selection to check any information you were unable to recite.
2. Fix it in your memory, either by repetition or memory association.
3. Recite and Review alternately until you have achieved satisfactory recall.

THE THEORY OF TIME-SPACED LEARNING

The most effective method for retaining any new knowledge and saving time in the process is to study material in a series of short study sessions interspersed with periods of other work or interests. This method is called "Time-Spaced Learning." You can use this method for studying, writing, practicing speeches, or accomplishing any mental task.

Let us suppose that you have to memorize some factual data. Study the material intently for fifteen minutes, put it aside, then devote your attention to some other work for about fifteen minutes. Pick up your study material again and concentrate on it for another fifteen minutes. Again divert your attention to other subjects. Continue this plan of time-spaced learning until you know the material thoroughly.

If you had taken the two hour's study at one time, you would have found that your results would not have been as successful.

PRINCIPLES OF INSTRUCTION (TIME-SPACED LEARNING DEMONSTRATION)

____ Study material in a series of short study periods instead of cramming material into one long, tiresome period.

____ Frequent short study periods help one to remove misconceptions. As one reviews, he modifies or corrects his thinking on the subject.

____ Review familiar material first, then proceed with the unfamiliar material.

____ Ideas have to sink into our subconscious minds and become set. This idea is called the "jello" concept. Jello when first made is a liquid. As time passes, the liquid cools; it is placed in the refrigerator to cool even more and finally solidify into jello. Ideas have to rest in the subconscious mind for a period of time before they become fixed in our minds.

____ Too many ideas at one time will confuse you. Psychologists claim that the human brain can successfully handle six to seven ideas during one time period. You will have good retention if enough repitition is used.

____ Too much emphasis on one point will cause you to react unfavorably to any idea, so try not to hammer away too long at any one point.

BENEFITS OF "TIME-SPACED" LEARNING

Greater retention and recall capability.

Less fatigue while learning

Working in cooperation with your brain rather than against it.

Mapping: A Technique for Translating Reading into Thinking

Adapted from "Mapping: A Technique for Translating Reading into Thinking"

Journal of Reading, January 1971

A map is a graphic representation of the intellectual territory traveled or to be traveled via reading. It is a verbal picture of ideas which the reader organizes and symbolizes. Map making, an exercise in critical thinking, demands the student's insightful judgments and discriminate decisions about the material.

After the student has completed the map, he has a graphic summary of the chapter. All on one page, all comprehensible at a glance, the student's map provides him with notes for easy review. Imagine the difference in reviewing ten pages of maps - one map representing each chapter - and in rereading ten chapters. The Gestalt, seeing the whole and all its related parts, yields a powerful impact, immediate comprehension, and easy retention.

Each map is unique - reflecting the student's own personality. But the following steps will enable him to construct a useful and successful map:

1. First the reader decides the map's starting point by locating the primary thesis or main idea. This is usually revealed by the chapter title and topic headings. To make the main idea stand out, he draws a circle or square around it, puts it at the top of a pyramid, etc.

2. Next he determines the second categories or principle parts. These are easily determined by observing subheadings, those headings listed in the extended table of contents found at the front of the book, etc.

3. After labeling these parts, the reader connects them to the main idea in such a way that their relationship is revealed. The reader now has a picture of the intellectual material he must explore and conquer. If he places a question mark after each category, he knows what answers are needed.

4. After reading and from memory, the student completes his map by adding details aloud. He should not clutter up the map and obscure its impact by adding too many details on paper.

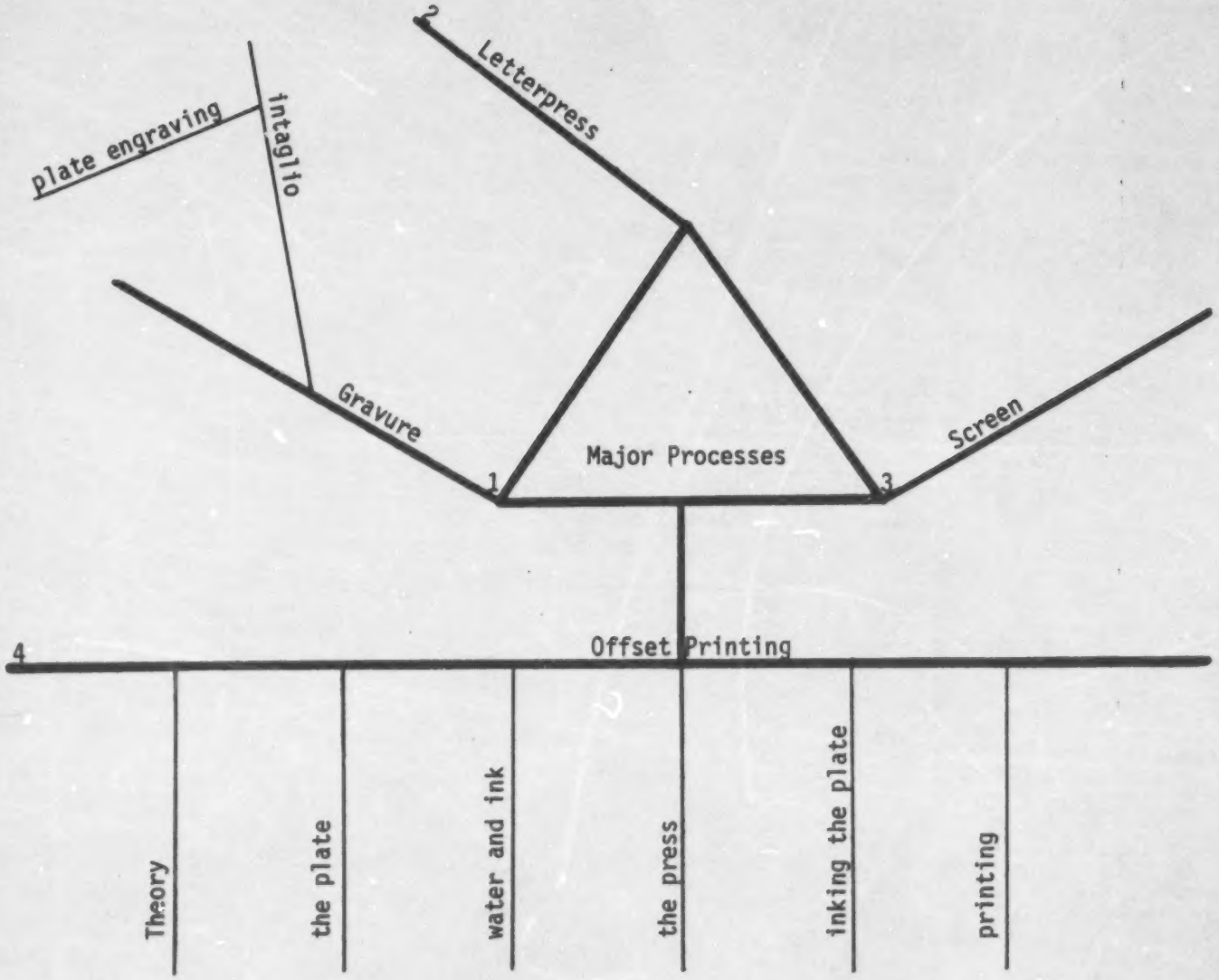
The map can then be used to generate essay-type questions which will bring together the topic's main points. The student should ask "What is the relationship of these points to one another" while he is constructing the map. Once it is completed, the questions must focus on why they are so related, or why the author presented them in the relationship he did.

Mapping - Sample 1

The Skeleton

From "Photo Offset Fundamentals"

Chapter 1 - Major Printing Processes

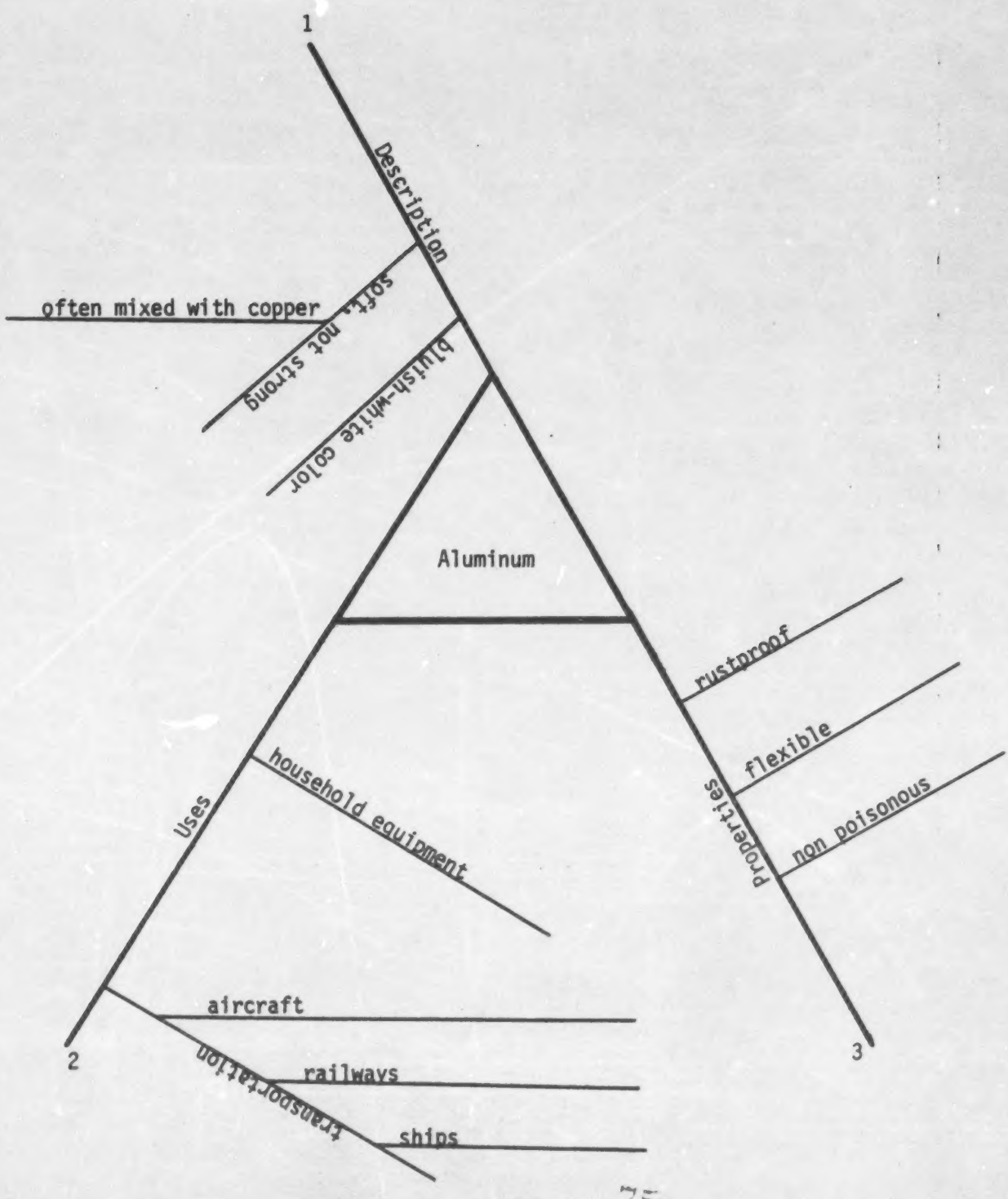


Mapping - Sample 2

Mapping a Short Article

From "Understanding Technical English"

Chapter 11 - Aluminum

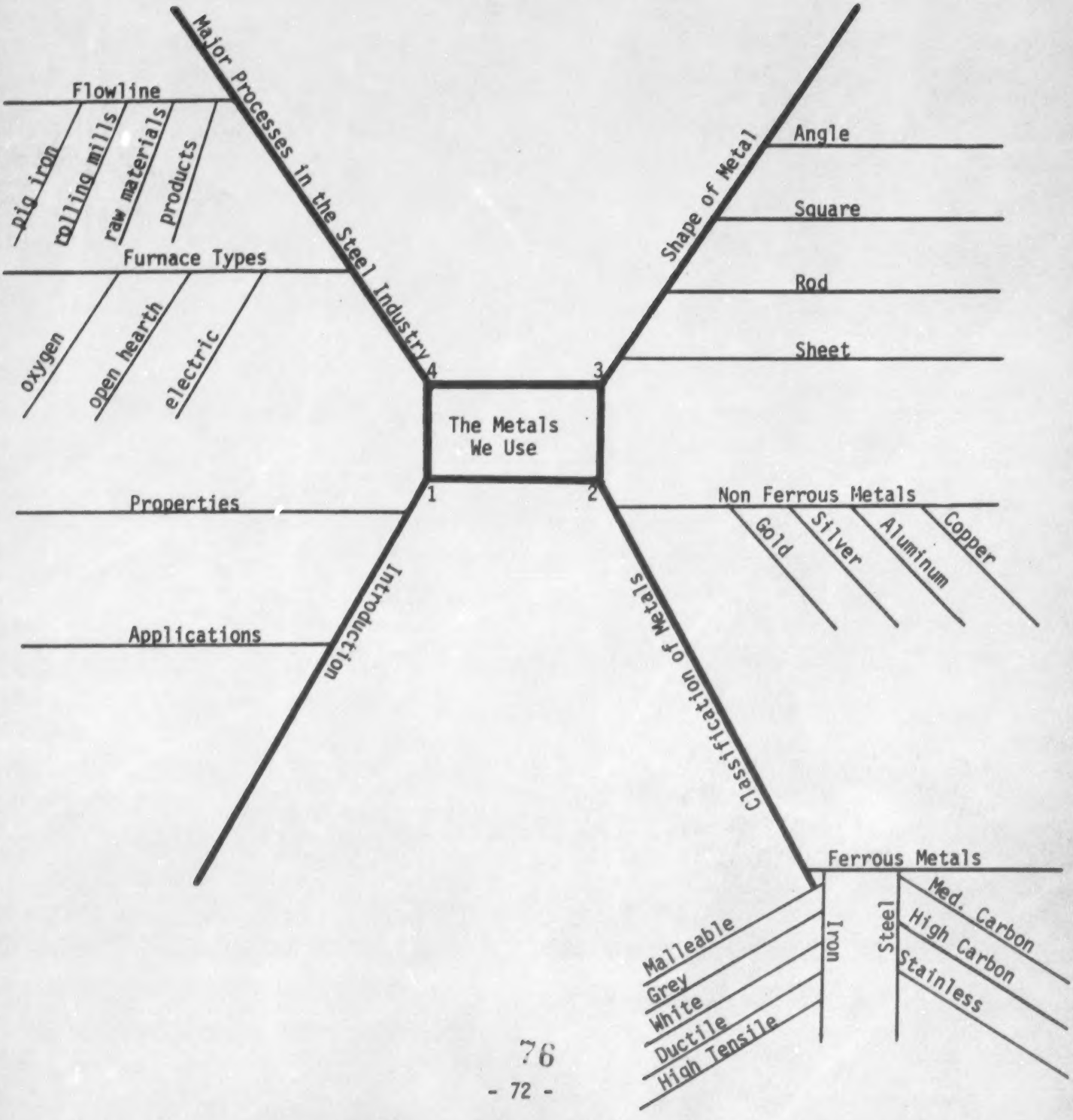


Mapping - Sample 3

Mapping a Long Chapter

From "Exploring Metalworking"

Chapter 1 - The Metals We Use



APPENDIX

Some Principles of Syllabication

General Rule

The number of syllables in each word is the same as the number of vowel sounds heard.

1. When the first vowel of a two-syllable word is followed by two like or unlike consonants, the word may be divided into syllables between the two consonants.

   col/lar bub/ble

2. When dividing a two-syllable word with a single consonant in the middle of the word:

   1. divide before the consonant if the first vowel stands for a long vowel sound pea/nut
   2. divide after the consonant if the first vowel stands for a short vowel sound. liv/er

3. Two consonants that form a consonant blend, digraph or other letter combination that stands for a single sound are never separated when dividing words into syllables.

   ex/tract va/grant

4. Some words have vowel-only syllables in them.

   o/bey al/i/mony

5. When dividing a word containing two vowels together, decide whether the two vowels are a combination that stands for a single sound, or whether each stands for a different sound. If two vowels make one sound do not divide, if they make two separate sounds divide.

   i/on li/on

6. When dividing a word containing a prefix or suffix into syllables divide first between the prefix or suffix and the base word.

   re/state thank/ful

   Most affixes add only one syllable apiece to the base word. But there are a few two-syllable affixes.

   an/ti/freeze au/to/graph

7. To divide a compound word first divide between the two separate words which form the compound.

some/time some/where

Frequently the separate words which form a compound word can also be divided into syllables.

grand/chil/dren can/non/ball

Common Predictors Used in Readability Estimates

Average Sentence Length Premise: the longer, more complex the sentence, the more difficult to read.

Number of Syllables Premise: the more complex the word, the more difficult to read.

Number of "Unfamiliar" Words Premise: the more frequent the usage and reinforcement of the term, the easier it is to read.

THE BARRETT TAXONOMY

COGNITIVE AND AFFECTIVE DIMENSIONS OF READING COMPREHENSION

1.0 Literal Comprehension. Literal comprehension focuses on ideas and information which are explicitly stated in the selection. Purposes for reading and teacher's questions designed to elicit responses at this level may range from simple to complex. A simple task in literal comprehension may be the recognition or recall of a single fact or incident. A more complex task might be the recognition or recall of a series of facts or the sequencing of incidents in a reading selection. Purposes and questions at this level may have the following characteristics.

1.1 Recognition requires the student to locate or identify ideas or information explicitly stated in the reading selection itself or in exercises which use the explicit ideas and information presented in the reading selection. Recognition tasks are:

1.11 Recognition of Details. The student is required to locate or identify facts such as the names of characters, the time of the story, or the place of the story.

1.12 Recognition of Main Ideas. The student is asked to locate or identify an explicit statement in or from a selection which is a main idea of a paragraph or a larger portion of the selection.

1.13 Recognition of a Sequence. The student is required to locate or identify the order of incidents or actions explicitly stated in the selection.

1.14 Recognition of Comparison. The student is requested to locate or identify likenesses and differences in characters, times, and places that are explicitly stated in the selection.

1.15 Recognition of Cause and Effect Relationships. The student in this instance may be required to locate or identify the explicitly stated reasons for certain happenings or actions in the selection.

1.16 Recognition of Character Traits. The student is required to identify or locate explicit statements about a character which helps to point up the type of person he is.

1.2 Recall requires the student to produce from memory ideas and information explicitly stated in the reading selection. Recall tasks are:

1.21 Recall of Details. The student is asked to produce from memory facts such as the names of characters, the time of the story, or the place of the story.

1.22 Recall of Main Ideas. The student is required to state a main idea of a paragraph or a larger portion of the selection from memory, when the main idea is explicitly stated in the selection.

1.23 Recall of a Sequence. The student is asked to provide from memory the order of incidents or actions explicitly stated in the selection.

1.24 Recall of Comparisons. The student is required to call up from memory the likenesses and differences in characters, times, and places that are explicitly stated in the selection.

1.25 Recall of Cause and Effect Relationships. The student is requested to produce from memory explicitly stated reasons for certain happenings or actions in the selection.

1.26 Recall of Character Traits. The student is asked to call up from memory explicit statements about characters which illustrate the type of persons they are.

2.0 Reorganization. Reorganization requires the student to analyze, synthesize, and/or organize ideas or information explicitly stated in the selection. To produce the desired thought product, the reader may utilize the statements of the author verbatim or he may paraphrase or translate the author's statements. Reorganization tasks are:

2.1 Classifying. In this instance the student is required to place people, things, places, and/or events into categories.

2.2 Outlining. The student is requested to organize the selection into outline form using direct statements or paraphrased statements from the selection.

2.3 Summarizing. The student is asked to condense the selection using direct or paraphrased statements from the selection.

2.4 Synthesizing. In this instance, the student is requested to consolidate explicit ideas or information from more than one source.

3.0 Inferential Comprehension. Inferential comprehension is demonstrated by the student when he uses the ideas and information explicitly stated in the selection, his intuition, and his personal experience as a basis for conjectures and hypotheses. Inferences drawn by the student may be either convergent or divergent in nature and the student may or may not be asked to verbalize the rationale underlying his inferences. In general, then, inferential comprehension is stimulated by purposes for reading and teachers' questions which demand thinking and imagination that go beyond the printed page.

3.1 Inferring Supporting Details. In this instance, the student is asked to conjecture about additional facts the author might have included in the selection which would have made it more informative, interesting, or appealing.

3.2 Inferring Main Ideas. The student is required to provide the main idea, general significance, theme, or moral which is not explicitly stated in the selection.

3.3 Inferring Sequence. The student, in this case, may be requested to conjecture as to what action or incident might have taken place between two explicitly stated actions or incidents, or he may be asked to hypothesize about what would happen next if the selection had not ended as it did but had been extended.

3.4 Inferring Comparisons. The student is required to infer likenesses and differences in characters, times, or places. Such inferential comparisons revolve around ideas such as: "Here and there," "then and now," "he and he," "he and she," and "she and she."

3.5 Inferring Cause and Effect Relationships. The student is required to hypothesize about the motivations of characters and their interaction with time and place. He may also be required to conjecture as to what caused the author to include certain ideas, words, characterizations, and actions in his writing.

3.6 Inferring Character Traits. In this case, the student is asked to hypothesize about the nature of characters on the basis of explicit clues presented in the selection.

3.7 Predicting Outcomes. The student is requested to read an initial portion of the selections and on the basis of this reading he is required to conjecture about the outcome of the selection.

3.8 Interpreting Figurative Language. The student, in this instance, is asked to infer literal meaning from the author's figurative use of language.

4.0 Evaluation. Purposes for reading and teacher's questions, in this instance, require responses by the student which indicate that he has made an evaluative judgement by comparing ideas presented in the selection with external criteria provided by the teacher, other authorities, or other written sources, or with internal criteria provided by the reader's experiences, knowledge, or values. In essence evaluation deals with judgment and focuses on qualities of accuracy, acceptability, desirability, worth, or probability of occurrence. Evaluative thinking may be demonstrated by asking the student to make the following judgment.

4.1 Judgments of Reality or Fantasy. Could this really happen? Such a question calls for a judgment by the reader based on his experience.

4.2 Judgments of Fact or Opinion. Does the author provide adequate support for his conclusions? Is the author attempting to sway your thinking? Questions of this type require the student to analyze and evaluate the writing on the basis of the knowledge he has on the subject as well as to analyze and evaluate the intent of the author.

4.3 Judgments of Adequacy and Validity. Is the information presented here in keeping with what you have read on the subject in other sources? Questions of this nature call for the reader to compare written sources of information, with an eye toward agreement and disagreement or completeness and incompleteness.

4.4 Judgments of Appropriateness. What part of the story best describes the main character? Such a question requires the reader to make a judgment about the relative adequacy of different parts of the selection to answer the question.

4.5 Judgments of Worth, Desirability and Acceptability. Was the character right or wrong in what he did? Was his behavior good or bad? Questions of this nature call for judgments based on the reader's moral code or his value system.

5.0 Appreciation. Appreciation involves all the previously cited cognitive dimensions of reading, for it deals with the psychological and aesthetic impact of the selection on the reader. Appreciation calls for the student to be emotionally and aesthetically sensitive to the work and to have a reaction to the worth of its psychological and artistic elements. Appreciation includes both the knowledge of and the emotional response to literary techniques, forms, styles, and structures.

5.1 Emotional Response to the Content. The student is required to verbalize his feelings about the selection in terms of interest, excitement, boredom, fear, hate, amusement, etc. It is concerned with the emotional impact of the total work on the reader.

5.2 Identification with Characters or Incidents. Teachers' questions of this nature will elicit responses from the reader which demonstrate his sensitivity to, sympathy for, and empathy with characters and happenings portrayed by the author.

5.3 Reaction to the Author's Use of Language. In this instance the student is required to respond to the author's craftsmanship in terms of the semantic dimensions of the selection, namely, connotations and denotations of words.

5.4 Imagery. In this instance, the reader is required to verbalize his feelings with regard to the author's artistic ability to paint word pictures which cause the reader to visualize, smell, taste, hear, or feel.

	Word Part	Meaning	Clue Word
1.	a	on	ashore
2.	a, an	without, not	amoral
3.	ab	from	abstain
4.	acou, acu	hear	acoustics
5.	acr, ac	sharp	acute
6.	acro	high	acrobat
7.	ad, ac, al, af, ag, an as, ap, ar, at	to, toward	attach, adhere
8.	aesthet, esthet	perception, sensation	aesthetics
9.	agon	contest	agony
10.	alter	another	alternate
11.	ama, ami	love	amity
12.	ambi	both, around	ambivalent
13.	ambul	walk, go	ambulatory
14.	amphi	both	amphibious
15.	andr	man	android
16.	anim	life, spirit, mind	animate
17.	anni	year	annual
18.	ante	before, forward	antecedent
19.	anthrop	mankind	anthropology
20.	anti	against	anti-freeze
21.	aqua	water	aquarium
22.	arch	rule, chief	archbishop

	Word Parts	Meaning	Clue Word
23.	astro, ast, aster	star	astrology
24.	aud, audit	hear	auditory
25.	auto	self	automatic
26.	avi	bird	aviary
27.	baro	weight	barometer
28.	be	completely	bejeweled
29.	belli, bel, bell	war	belligerent
30.	bene	well, good	beneficial
31.	bi	two	bicycle
32.	biblio	book	bibliography
33.	bio	life	biology
34.	bov	cattle	bovine
35.	by	secondary	by-product
36.	camera	chamber	bicameral
37.	cani	dog	canine
38.	cand, cend	glow	candle
39.	cant	sing	cantor
40.	cap	take, hold	capture
41.	capit	head	decapitate
42.	card	heart	cardiac
43.	carn	flesh	carnivorous
44.	caust, caut	burn	caustic
45.	cav	hollow	cavity

	Word Part	Meaning	Clue Word
46.	cede, ceed, cess	yield, go	excess
47.	cent	hundred	century
48.	chromo	color	monochromatic
49.	chrono	time	chronology
50.	cide, cid, cis	kill	patricide
51.	circum, circu	around	circumference
52.	clud, clus	shut	seclusion
53.	com, con, col, co	with, together	co-operate
54.	contra, contro	against	contrary
55.	corp	body	corpse
56.	cosm, cosmo	universe	microcosm
57.	counter	against	counteract
58.	crat, cracy	rule	democratic
59.	cred, creed	belief	incredible
60.	crypt	secret, hidden	cryptography
61.	cumb	lie down	recumbent
62.	cur, curs, curr	run	current
63.	cycl	circle	tricycle
64.	de	from, down	descend
65.	dec, deci	ten, tenth	decade
66.	dei	god	deity
67.	demi	half, partly	demitasse
68.	demo	people	democracy

	Word Part	Meaning	Clue Word
69.	dent	tooth	dentist
70.	derm	skin	dermatology
71.	di	two, double	dichotomy
72.	dia	through, across	diameter
73.	dic, dict	speak	diction
74.	dis	away from	distort
75.	div	separate	divide
76.	dorm	sleep	dormant
77.	dox, doct	opinion, think	orthodox
78.	du	two	dual
79.	duc, duct	lead	inducted
80.	dur	hard	durable
81.	dyna	power	dynamo
82.	dys	bad, difficult	dysentery
83.	eco	house	ecology
84.	ego	I	egotist
85.	em, en	in	empathy
86.	em, empt	buy, obtain	redemption
87.	enni	year	centennial
88.	enter, entre	among, between	entertain
89.	epi	upon, outer	epidermis
90.	equ	horse	equine
91.	esque	like, resembling	statuesque

	Word Part	Meaning	Clue Word
92.	ethn	race, nation	ethnic
93.	eu	good, well	eulogy
94.	ex, ef, es, e	out, formerly	emit, exit
95.	extra	beyond, over	extravagant
96.	fac, fec, fic	make, do	fictitious
97.	fer	carry, bear	conifer
98.	ferr	iron	ferrous
99.	ferv	boil, bubble	effervescent
100.	fid	faith, trust	fidelity
101.	fin, fini	limit	infinite
102.	flagr	burn	conflagration
103.	flect, flex	bend	reflect
104.	flor	flower	floriculture
105.	flu, flux	flow	fluent
106.	for	prohibit, omit	forget
107.	fore	before	forewarn
108.	fort, forc	strong	fortress
109.	forth	forward, onward	forthcoming
110.	frater, frat	brother	fraternity
111.	gamy	marriage	monogamy
112.	gastr	stomach	gastric
113.	gene, gen	origin	genesis
		race	genocide
		type	genre

	Word Part	Meaning	Clue Word
114.	geo, ge	earth	geography
115.	geronto	old	gerontology
116.	gnosis, gnostic	recognition	diagnostic
117.	grad, gress, gred	go, step	regress
118.	graph, gram	write, record	telegraph
119.	grav, griev	heavy	gravity
120.	gyne	woman	gynecology
121.	hab, hib	have, hold	inhibit
122.	helio	sun	heliocentric
123.	hemo, haemo	blood	hemophelia
124	hemi	half	hemisphere
125.	hetero	other, different	heterosexual
126.	hiero	sacred	heiroglyphic
127.	homo	same	homogeneous
128.	hydr	water	hydrant
129.	hyper	over, above	hyperactive
130.	iatry, iatric	medical treatment	psychiatry
131.	idio	one's own, personal	idiosyncracy
132.	ign	fire	ignite
133.	in, im, il, ir	not, in	inactive, insert
134.	inter	between	intercept
135.	intra, intro	within, among	intramural
136.	itis	inflammation	tonsilitis

	Word Part	Meaning	Clue Word
137.	ject, jac	throw	eject
138.	jud, judic	judge, decide	judicious
139.	junct	join	junction
140.	kilo	thousand	kilometer
141.	kine, cine	move	kinetic
142.	leg	law	legal
143.	liber	to free	liberate
144.	libr	book	library
145.	lingua	tongue, language	bilingual
146.	lith	stone	neolithic
147.	locu, loqu, log	speak	dialogue
148.	logy	study of	psychology
149.	luc	light, clear	lucid
150.	macro	large	macrocosm
151.	magn	great	magnify
152.	mal	bad, ill	malfunction
153.	mamma	breast	mammal
154.	manu, man	hand	manual
155.	mania	craving for	kleptomania
156.	matri, mater	mother	maternal
157.	mechano	machine	mechanical
158.	mega	large	megaphone
159.	meter, metr	measure	metric
160.	metry	science of measuring	geometry

	Word Part	Meaning	Clue Word
161.	micro	small	microscope
162.	mid	middle	midnight
163.	milli	thousand	millimeter
164.	mini, minu	less	minimal
165.	mis	wrong	misspell
166.	miso	hatred of	misogamy
167.	miss, mit	send	dismiss
168.	mob, mov, mot	to move	motion
169.	mono	one	monotone
170.	morph	form	amorphous
171.	mort	death	mortal
172.	multi	many	miltitude
173.	nat	born	pre-natal
174.	naut	sail	nautical
175.	nebul	cloud	nebulous
176.	neo	new	neophyte
177.	noc, nox	harmful	noxious
178.	noct	night	nocturnal
179.	non	not	nonstop
180.	nov	new	innovative
181.	ob, oc, of, op	against	oppress, object
182.	oct	eight	octopus
183.	ocul	eye	oculist

	Word Part	Meaning	Clue Word
184.	oid	resembling	ovoid
185.	omni	all	omnipresent
186.	onym	name, word	pseudonym
187.	ortho	correct, straight	orthodontist
188.	osis	condition	psychosis
189.	osteo, ost	bone	osteopath
190.	out	better than	outrun
191.	over	above, beyond	overstate
192.	pac, pax	peace	pacifist
193.	paleo	old	paleontology
194.	pan	all	Pan-American
195.	par, pair, pier	equal	disparity
196.	para	beside	parallel
197.	path	feeling, illness	pathetic
198.	patri, pater	father	paternity
199.	ped, pod	foot	pedal
200.	pel	drive	propel
201.	pend, pens	hang, weight	pendant
202.	penta	five	pentagon
203.	per	through	perspire
204.	peri	around	perimeter
205.	petr	rock	petrified
206.	philo	love	philosophy

	Word Part	Meaning	Clue Word
207.	phobia	fear of	acrophobia
208.	phono	sound	phonetics
209.	photo	light	photograph
210.	physio	nature	physics
211.	plac	please, appease	placate
212.	plic, plict, plex, pli, ply	weave, fold, twist	implicate
213.	pneum	air	pneumatic
214.	polis, polit	city	metropolis
215.	poly	many	monopoly
216.	port	carry	portable
217.	pos, pon, posit	place	position, deposit
218.	post	after	post-war
219.	pot	power	potent
220.	pre	before	pre-war
221.	primo	first	primitive
222.	pro	forward, favor of	propel
223.	pseud	false	pseudoscience
224.	psych	mind	psychic
225.	pugn	fight	pugnacious
226.	punct, pung	point, to prick	puncture
227.	purg	cleanse	purge
228.	pyre, pyro	fire	pyromania
229.	quad, quart	four	quartet

	Word Part	Meaning	Clue Word
230.	quint	five	quintet
231.	re	back, again	return
232.	reg, rig, rect	rule, kingly	regal
233.	retro	back	retrospect
234.	rupt	break	erupt
235.	sacr, sacer, secr, sanct	sacred	sacrament, sanction
236.	sanguin, sangui	blood	sanguine
237.	scend	climb	descend
238.	sci	know	omniscient
239.	scrib, scrip	write	scribble
240.	se	aside	seduce
241.	secu, sequ	follow	sequal
242.	sect, seg	cut	bisect
243.	semi	half	semiconscious
244.	seni	old	senile
245.	sens, sent	feel, aware	sensious
246.	simil, simul, sembl	like	similar
247.	sol	sun	solar
248.	soli	alone	solitude
249.	somni	sleep	insomnia
250.	son	sound	supersonic
251.	soph	wise	sophomoric
252.	spect, spec	see	spectator
253.	spir	breathe	respire

	Word Part	Meaning	Clue Word
254.	sta, stat, stit	place, cause, stand	constitute
255.	strict	tighten	construct
256.	sub, sup, sus	under	suspend
257.	super, sur	over	superego
258.	surg	rise	insurgent
259.	sym, syn	with, together	sympathy
260.	tang, tact, tig, ting	touch	tangible
261.	tax	arrangement	syntax
262.	techno, tech, tect	skill	technician
263.	tele	far	telepathy
264.	ten, tin, tent, tain	stretch	tendon
265.	tend, tens, tent, tenu	hold	tenacious
266.	terri	earth	territory
267.	tert	third	tertiary
268.	thei, theo	god	theology
269.	therm	heat	thermometer
270.	tomy	cut	vasectomy
271.	tors, tort	twist	extortion
272.	toxico	poison	toxic
273.	tract	pull	extract
274.	trans	cross, over, change	transfer
275.	tri	three	trio
276.	trope	turn	heliotrope

	Word Part	Meaning	Clue Word
277.	typ	print	typewriter
278.	ultra	beyond, over	ultramodern
279.	un	not	unsafe
280.	unct, ung	oil	unctuous
281.	und, ound	wave	redundant
282.	under	below	underline
283.	uni	one	unity
284.	vacu, vava	empty	vacuum
285.	veni, vent	come	convention
286.	verd	green	verdent
287.	vers, vert, vort, vors	turn	reverse
288.	vid, vis	see	invincible
289.	vinc	conquer	invincible
290.	vit, viv	life	vitality
291.	voc, voke	voice, call	evoke
292.	voli, volunt	wish	volunteer
293.	volv, vol	roll, to turn	revolve
294.	zo, zoo	animal	zoology
295.	vul	cut, wound	vulnerable

Suffix Clues

I	Noun Suffixes	Sample
	ance	aquaintance
	ary	cemetary
	ation	education
	ence	independence
	er (one who)	teacher
	ery	tannery
	ion	opinion
	ism	socialism
	ist	psychiatrist
	ity	electricity
	ment	punishment
	ness	happiness
	or	doctor
	ory	laboratory
	sion	decision
	tion	action

II	Verb Suffixes	Sample
	ate	educatate
	en	strengthen
	ify	magnify
	ize	realize

Suffix Clues

III	Adjective Suffixes	Sample
	able	portable
	al	brutal
	ant	pleasant
	er (more)	bigger
	est (more)	biggest
	fic	scientific
	ful	harmful
	ible	invisible
	ic	artistic
	ish	stylish
	ive	attractive
	less	hopeless
	ous	courageous

IV	Adverb Suffix	Sample
	ly	slowly